Attorney Docket No: 9052-228 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Bain et al. Confirmation No. 4628
Serial No.: 10/551,335 Examiner: Mark A. Osele
Filed: September 29, 2005 Group Art Unit: 1791
For: *METHOD AND APPARATUS FOR BONDING AND DEBONDING ADHESIVE INTERFACE SURFACES*

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R § 1.132
OF ERIC PAPON, Ph.D.

Sir:

I, Eric Papon, do hereby declare and say as follows:

1. I received my PhD from the University of Bordeaux (France) in 1992 for my research performed at the Laboratoire de Chimie des Polymères Organiques. I am currently the Head of the Carnot Institute Materials & Systems Institute of Bordeaux and President of the French Adhesion Society. I am also the Chairman of the World Congress on Adhesion and Related Phenomena, which will be held in 2010. A biographical sketch listing additional experience and qualifications is attached herewith.

2. I have read and understand the contents of U.S. Patent Application Serial No. 10/551,335 to Bain et al. (hereinafter, "the present application").

3. I have read the Office Action dated August 17, 2009 issued in connection with the present application (hereinafter, "the Office Action") and am familiar with the contents thereof. I have also reviewed WIPO Publication WO 00/75254 to Bain et al.

(hereinafter "Bain"), U.S. Patent No. 6,936,644 to Gilleo (hereinafter "Gilleo"), and U.S. Patent Publication Nos. 2002/0007910 to Bennett et al. (hereinafter "Bennett") and 2004/0014860 to Meier et al. (hereinafter "Meier"), each of which is cited in the Office Action.

4. Bain describes an adhesive composition containing microcapsules that expand when heated, thereby weakening the existing adhesive bonds and facilitating separation of the bonded surfaces. As noted on page 8, heat activation of Bain's microcapsules facilitates such removal in several ways:

- heat activation "causes the beads/fibres to thermoexpand thus creating pressure along the rim of the glazing"
- heat activation "reduces the viscosity and the shear or tear stress of the adhesive material"
- heat activation "reduces the cohesive stress and/or interfacial adhesive bonding of the adhesive film between two bonded surfaces"

Accordingly, once Bain's microcapsules have been activated, the combination of a reduction in cohesive forces and the expansion of the adhesive material itself results in an overall weakening of the adhesive bond between the two surfaces.

5. The Examiner's assertion (on page 2 of the Office Action) that Bain describes "a first set of microspheres being associated with curing and bonding" is a mischaracterization. Bain is quite clear that the microspheres are designed to weaken the adhesive bond for an easy removal—there is no suggestion that the microspheres might be involved in the bonding process likewise they can be considered as inert additives.

That Bain's microspheres are not involved in the bonding process is evident from the way in which the overall composition is described: "a composition comprising an adhesive agent and dispersed therein thermoexpandable microcapsules." *See* page 5, lines 12–14. The microspheres are described as being *in* the adhesive agent, not as part of the adhesive agent. The composition thus includes two distinct components: an adhesive agent and thermoexpandable microspheres designed to facilitate removal of the adhesive

agent after heat activation. This interpretation is buttressed by Bain's pronouncement that the microspheres can be provided in the form of a powder that is "introduced into and mixed with" the adhesive agent just before it is applied to the target surface(s). *See* page 5, lines 25–31.

Moreover, all of the materials described as being encapsulated in Bain's microspheres are involved in the debonding process. Although they utilize different mechanisms, each achieves the same result: weakening of the adhesive bond.

For instance, Bain proposes the use of an expanding agent or an agent capable of sublimation, either of which would result in the physical expansion of the adhesive agent and a reduction in the adhesive forces between the two surfaces. Activation of an explosive agent would result in a similar weakening of the adhesive bond. So too would an activator agent that caused foaming of the adhesive agent (as described on page 6, line 16).

In addition, Bain proposes the use of an activator agent that is capable of promoting further polymerization and cross-linking of the adhesive agent. *See* page 7, lines 1–3. Introducing such an activator into the cured adhesive would result in the physical shrinkage of the adhesive agent and a weakening of the adhesive bond as the adhesive agent pulled away from the bonded surfaces. Releasing a "curing agent" into the already-set adhesive (*See* page 8, lines 1–2) would have a similar effect—a second "curing" step would cause the adhesive agent to shrink and become harder and more brittle, thereby reducing the stability of the adhesive bond.

Finally, Bain describes the encapsulation of water. Here, the purpose is obvious: "The inclusion of water . . . is to allow the adhesive composition to weaken in certain conditions."

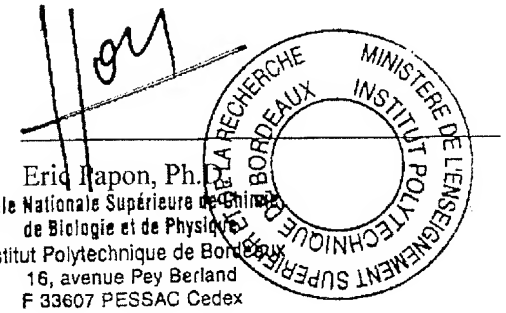
Although Bain does describe the use of a "fast cure agent or catalyst, whereby the adhesive composition is rapidly cured and set" (page 6, lines 4–5), it is quite clear that

such an agent is meant to be included *with* the microspheres, not *in* the microspheres. That is, the composition would include an adhesive agent, a fast cure agent that helps to rapidly cure the adhesive agent during installation, and thermoexpandable microspheres designed to facilitate subsequent removal of the adhesive agent. *See* page 6, lines 4–5. This interpretation is supported both by the language used to describe the fast cure agent and the manner in which Bain employs its microspheres.

Bain describes its composition as "additionally compris[ing] a fast cure agent or catalyst." *See* page 6, line 4. This statement raises the question: In addition to what? The answer as understood by one skilled in the art: In addition to the adhesive agent and the thermoexpandable microsphere powder described in the preceding paragraph (and the colouring agent described in the subsequent sentence). Accordingly, if the fast cure agent is included in addition to the thermoexpandable microspheres, it cannot be *in* the thermoexpandable microspheres.

Indeed, the fast cure agent mustn't be in the thermoexpandable microspheres. If Bain's fast cure agent were in the microspheres it could not "rapidly cure[] and set" the adhesive agent because the microspheres do not release their contents until they are heated. But, if the microspheres were heated during the initial installation phase, rapid curing would be prevented by the release of expanding agents, explosive agents, foaming agents, etc. Thus, Bain should not be read to mean that its "fast cure agent or catalyst" is encapsulated within the thermoexpandable microspheres.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.



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January 5, 2010
Date